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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/551,934	10/04/2005	Tsumoru Ohata	043888-0403	6449
53080 7590 01/31/2007 MCDERMOTT WILL & EMERY LLP 600 13TH STREET, NW WASHINGTON, DC 20005-3096			EXAMINER LEE, CYNTHIA K	
			ART UNIT	PAPER NUMBER
			1745	
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		01/31/2007	PAPER	

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

## Office Action Summary

Application No.

10/551,934

Applicant(s)

OHATA ET AL.

Examiner

Cynthia Lee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 12 January 2007.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,5,7,13,14 and 16-37 is/are pending in the application.
- 4a) Of the above claim(s) 33 and 34 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,5,7,13,14,16-32 and 35-37 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 10/04/2005, 12/1/2006.

- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

***Election/Restrictions***

Applicant's election of Group I and Species I-b in the reply filed on 1/12/2007 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

The Examiner has joined Species I-a with Species I-b and thus, claims 1, 5, 7, 13, 14, 16-32, 35, and 36 are under examination.

***Priority***

Acknowledgement has been made of applicant's claim for priority under 35 USC 119 (a-d). The certified copy has been filed on 10/04/2005.

***Preliminary Amendment***

The claims filed 1/31/2006 has been placed in the application file and the information referred to therein has been considered as to the merits.

***Information Disclosure Statement***

The Information Disclosure Statement (IDS) filed 10/4/2005 and 12/1/2006 have been placed in the application file and the information referred to therein has been considered.

***Drawings***

The drawings received 10/4/2005 are acceptable for examination purposes.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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Claim 5 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Regarding claim 5, "particle size" is interpreted as "median size D<sub>50</sub> based on volume" (as disclosed in [0072] of the instant application PGPUB 2006/0216608). It is unclear to the Examiner as to what "median size D<sub>50</sub> based on volume" means.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 7, 13, 27-32, 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Delnik (US 5948464) in view of Maeda (US 2003/0113626).

Delnik discloses a lithium ion battery comprising a positive and negative electrode, and a porous film interposed between the two electrodes. The porous film comprises solid particulates (applicant's filler) and a polymer binder (applicant's resin binder). The separator ink is formulated to contain a ratio of polymer binder to solid particulate material ranging preferably from about 5/95 to 10/90 (7:25-26). The solid particulates include alumina (6:48) (instant claims 7, 29).

Delnik does not disclose a binder comprising core-shell type rubber particles having an adhesive surface portion including at least an acrylonitrile, an acrylate, or a methacrylate unit (claims 1, 16, 17, 21, 23, 28). Maeda teaches a binder comprising a

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core-shell type rubber particles [0028]. The rubber particles include acrylonitrile, acrylate, or a methacrylate [0043, 0044, 0046]. The surface of the particles necessarily is adhesive because it is a binder. It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Maeda's binders to Delnik's separator ink for the benefit of imparting a well-balanced binding power and binding durability [0009]. Further, it has been held by the court that the selection of a known material based on its suitability for its intended use is *prima facie* obvious. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07.

Regarding claim 27, the amount of resin binder on one side is necessarily smaller than the second side because the particles are so small that it is not possible to have equal amounts on both sides without a controlled method of applying the separator ink.

Regarding claims 30 and 31, The Examiner notes that Maeda discloses polyacrylonitrile as one of the polymers [0046] and it possesses a melting temperature of 317 C (see attached). The Examiner notes that the decomposition temperature is necessarily higher than the melting temperature.

Regarding claim 32, Delnik discloses that the separator ink was first printed onto the electrode plate and dried in a vacuum oven at a temperature range of 90 to 130 C to remove the solvent (8:10-15). Since Applicants disclose that gradual increase in the binder concentration gradient is achieved by drying the mixture between 100 C and 180 C, Delnik modified by Maeda necessarily has a gradual increase in the binder content from first side to second side. MPEP states that prior art which teaches a range

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overlapping or touching the claimed range anticipates if the prior art range discloses the claimed range with "sufficient specificity." See 2131.03.

Claims 14, 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Delnick (US 5948464) in view of Maeda (US 2003/0113626) as applied to claims 1 and 27 above, further in view of Murai (US 2002/0048704).

Delnick modified by Maeda teaches a porous film, but does not teach a porous film and a separator. However, Murai teaches of a separator made of an electrically insulating material that has sufficient strength, such as porous film, net, and nonwoven fabric. While not limiting, a single layer or multilayer porous film of polyethylene or polypropylene is preferred [0030]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to add a layer or a plurality of layers of polyethylene or polypropylene to Delnick's porous composite separator layer modified by Maeda for the benefit of increasing the insulation and strength of the separator to avoid short circuiting. It has been held by the court that the selection of a known material based on its suitability for its intended use is *prima facie* obvious. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07.

Delnick modified by Maeda does not teach a wound battery. However, Murai teaches a wound battery (fig. 3 and 4). It would have been obvious to one of ordinary skill in the art at the time the invention was made to form a wound battery of Delnick

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modified by Maeda for the benefit of shaping the battery suitable for the intended application.

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Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Delnik (US 5948464) in view of Maeda (US 2003/0113626) as applied to claim 1 and incorporated herein, further in view of Sheibley (US 4371596).

Delnik does not disclose the filler comprising a mixture of a large particle group and a small particle group. Sheibley teaches a separator comprising a filler material with two distinct particle sizes so that the smaller particles fit or pack within the interstices between the larger particles. The pores are created through the highly tortuous pathway of plasticizer between the well-packed filler particles. The pore size depends upon the surface area of the fillers (4:10-20). Sheibley teaches that the particle size groups are 0.01 to 0.02 microns and 0.1 to 0.2 microns (5:55-60). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Delnik's filler material with two distinct particle sizes, as taught by Sheibley, for the benefit of better packing the particles as well as to vary the pore size.

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Claims 21-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Delnik (US 5948464) in view of Maeda (US 2003/0113626), further in view of Sheibly (US 4371596).

Delnik discloses a lithium ion battery comprising a positive and negative electrode, and a porous film interposed between the two electrodes. The porous film comprises solid particulates (applicant's filler) and a polymer binder (applicant's resin binder). The separator ink is formulated to contain a ratio of polymer binder to solid particulate material ranging preferably from about 5/95 to 10/90 (7:25-26). The solid particulates include alumina (6:48) (instant claims 24).

Delnik does not disclose a binder comprising core-shell type rubber particles having an adhesive surface portion including at least an acrylonitrile, an acrylate, or a methacrylate unit (claims 21, 23). Maeda teaches a binder comprising a core-shell type rubber particles [0028]. The rubber particles include acrylonitrile, acrylate, or a methacrylate [0043, 0044, 0046]. The surface of the particles necessarily is adhesive because it is a binder. It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Maeda's binders to Delnik's separator ink for the benefit of imparting a well-balanced binding power and binding durability [0009]. Further, it has been held by the court that the selection of a known material based on its suitability for its intended use is *prima facie* obvious. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07.

Delnik does not disclose an elongating percentage of said porous film is 15% or more (instant claim 21). Sheibly teaches a separator comprising a filler material with



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two distinct particle sizes so that the smaller particles fit or pack within the interstices between the larger particles. The pores are created through the highly tortuous pathway of plasticizer between the well-packed filler particles. The pore size depends upon the surface area of the fillers (4:10-20). Sheibley teaches that the particle size groups are 0.01 to 0.02 microns and 0.1 to 0.2 microns (5:55-60). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Delnik's filler material with two distinct particle sizes, as taught by Sheibley, for the benefit of better packing the particles as well as to vary the pore size.

Regarding claim 21, the Examiner notes that the elongating percentage of the porous film depends on the amount of binder as well as the filler particle size ratio (see [0195] of instant application PGPUB US 2006/0216608). Thus, the combination of Delnik modified by Maeda and Sheibly would necessarily have an elongating percentage of said porous film of 15% or more.

Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Delnik (US 5948464) in view of Maeda (US 2003/0113626), further in view of Sheibly (US 4371596) as applied to claim 21, further in view of Murai (US 2002/0048704).

Delnick modified by Maeda and Sheibly teaches a porous film, but does not teach a porous film and a separator. However, Murai teaches of a separator made of an electrically insulating material that has sufficient strength, such as porous film, net, and nonwoven fabric. While not limiting, a single layer or multilayer porous film of

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polyethylene or polypropylene is preferred [0030]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to add a layer or a plurality of layers of polyethylene or polypropylene to Delnik's porous composite separator layer modified by Maeda and Sheibly for the benefit of increasing the insulation and strength of the separator to avoid short circuiting. It has been held by the court that the selection of a known material based on its suitability for its intended use is *prima facie* obvious. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07.

Delnick modified by Maeda does not teach a wound battery. However, Murai teaches a wound battery (fig. 3 and 4). It would have been obvious to one of ordinary skill in the art at the time the invention was made to form a wound battery of Delnick modified by Maeda for the benefit of shaping the battery suitable for the intended application.

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Claims 16-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Delnik (US 5948464) in view of Maeda (US 2003/0113626) and Call (US 2002/0136945).

Delnik discloses a lithium ion battery comprising a positive and negative electrode, and a porous film interposed between the two electrodes. The porous film comprises solid particulates (applicant's filler) and a polymer binder (applicant's resin

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binder). The separator ink is formulated to contain a ratio of polymer binder to solid particulate material ranging preferably from about 5/95 to 10/90 (7:25-26). The solid particulates include alumina (6:48) (instant claims 7, 18, 24, 29).

Delnik does not disclose a binder comprising core-shell type rubber particles having an adhesive surface portion including at least an acrylonitrile, an acrylate, or a methacrylate unit (claims 16, 17). Maeda teaches a binder comprising a core-shell type rubber particles [0028]. The rubber particles include acrylonitrile, acrylate, or a methacrylate [0043, 0044, 0046]. The surface of the particles necessarily is adhesive because it is a binder. It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Maeda's binders to Delnik's separator ink for the benefit of imparting a well-balanced binding power and binding durability [0009]. Further, it has been held by the court that the selection of a known material based on its suitability for its intended use is *prima facie* obvious. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07.

Delnik modified by Maeda does not teach an average pore size of micropores in said porous film is 0.02 to 0.09  $\mu\text{m}$  (claim 16). Call teaches a microporous separator having pore size of from about 0.01 to 5 microns [0029]. Microporous battery separators are used to allow electrolytes to cross through the battery separators while preventing any contact between electrodes [0003]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Delnik modified by Maeda to have the pore size as taught by Call for the benefit of controlling the amount for electrolyte flowing through the separator.

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Delnik (US 5948464) in view of Maeda (US 2003/0113626) and Call (US 2002/0136945) as applied to claim 16, further in view of Murai (US 2002/0048704).

Delnick modified by Maeda and Call teaches a porous film, but does not teach a porous film and a separator. However, Murai teaches of a separator made of an electrically insulating material that has sufficient strength, such as porous film, net, and nonwoven fabric. While not limiting, a single layer or multilayer porous film of polyethylene or polypropylene is preferred [0030]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to add a layer or a plurality of layers of polyethylene or polypropylene to Delnik's porous composite separator layer modified by Maeda and Call for the benefit of increasing the insulation and strength of the separator to avoid short circuiting. It has been held by the court that the selection of a known material based on its suitability for its intended use is *prima facie* obvious. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07.

Delnick modified by Maeda does not teach a wound battery. However, Murai teaches a wound battery (fig. 3 and 4). It would have been obvious to one of ordinary skill in the art at the time the invention was made to form a wound battery of Delnick modified by Maeda for the benefit of shaping the battery suitable for the intended application.

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**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cynthia Lee whose telephone number is 571-272-8699. The examiner can normally be reached on Monday-Friday 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's trainer, Susy Tsang-Foster can be reached on 571-272-1293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ckl

Cynthia Lee

Patent Examiner

  
SUSYTSANG-FOSTER  
PRIMARY EXAMINER